AMENDMENTS TO THE DRAWINGS

Replacement drawing sheet 2/11 (Figures 2A, 2B and 2C) is submitted herewith. Figures 2A and 2B have been labeled "Prior Art" as suggested by the examiner. No other revisions are reflected on the replacement drawing sheet.

REMARKS

Claim 1 is amended, claim 2 is cancelled, and new claims 49-51 are presented. Claims 1 and 3-51 are pending in the application. Claims 1, 2, 4, 6, 7, 35 and 36 stand rejected as anticipated by *Harrison*; claims 1 and 3-8 stand rejected as anticipated by *Moses et al.*; claims 1-48 stand rejected as anticipated by the "*Submerged Floating Pipeline in Deep Water*" article (*Paulsen et al.*) and obvious in further view of the "*Offshore Technology Challenges-The Sigsbee Escarpment*" article (*Soliman et al.*); and claims 9-48 stand rejected as obvious in view of *Harrison* and *Moses et al.* Further examination of the application, as amended, and reconsideration of the rejections are respectfully requested.

Amended claim 1 recites the features of original claim 2, now canceled. Support for "on a sea floor" (claim 1) is found inter alia at paragraph [0009]. Support for "unbuoyed" (claim 1) is found inter alia at paragraph [0035]. Support for "unanchored" (claim 51) is found inter alia at paragraph [0041]. Support for "catenary" and "inverse catenary" (claims 49 and 50) is found inter alia at paragraph [0030]. No new matter is presented.

Figures 2A and 2B were objected to under 37 CFR 1.121(d). Figures 2A and 2B are corrected to add the label "Prior Art." Corrected drawings are attached.

By way of background, applicant's invention provides a method and apparatus to traverse a subsea topographic feature with a subsea pipeline including at least one distributed buoyancy region. Distributed buoyancy is discussed in the specification at paragraph [0008], for example, and is readily distinguished from concentrated buoyancy devices. Distributed buoyancy, for example, has the benefits of, in one embodiment, being a continuous coating of buoyant material which can simplify installation of the pipeline due to the elimination of any mounting system for a separate buoyancy attachment. Further, a distributed buoyancy region can shape the pipeline in a catenary or inverse catenary (emphasized in new claims 49-50), further reducing stress and aiding in predicting and designing for stresses.

Harrison discloses a method for correcting an unsupported span by releasing the axial tension imparted during pipeline deployment using a temporary concentrated buoyancy device, i.e. a releasable buoy. Regarding amended claim 1, *Harrison* does not teach a distributed buoyancy region, but in sharp contrast shows a single buoy in Figure 4. A single buoy cannot be said to anticipate the distributed buoyancy region in claim 1.

Nor would Applicant's amended claim 1 have been obvious in view of the *Harrison* method. *Harrison* teaches away from using the buoy as a permanent pipeline support. At column 5/line 59-61, after the pipe is deflected to the required level, one "disconnects buoy 20 from pipeline 10. Buoy 20 then slowly rises to the surface for later recovery while pipeline 10 moves toward seabed 16." The relatively low cost, easy release and recovery with the concentrated buoyancy device, and no disclosed or readily apparent advantage in using distributed buoyancy devices in *Harrison*, objectively evidences the non-obviousness of applicant's distributed buoyancy system, rather than suggesting obviousness.

Applicant's invention is directed to keeping a pipeline out of contact with the topographical feature on the seabed. See paragraph [0003] of the specification. In sharp contrast, *Harrison* teaches at 4/19-21 that after the buoy is released, the "local reduction of residual axial tension in pipeline 10 enables it to closely conform to the contours of any undulating seabed 16." It would not have been obvious to use the temporary buoy of *Harrison* to indefinitely support a pipeline during fluid transport when *Harrison* teaches squarely to the contrary to ultimately place the pipeline directly on the seabed at the topographic feature.

As to claim 4, *Harrison* does not disclose a buoyant coating material, only a single inflatable buoy. See 5/17-41. As to claim 7, there is no positively buoyant pipeline section disclosed, again only a single inflatable buoy temporarily attached to the pipeline. Similarly, *Harrison* teaches that the pipeline does not contain a buoyant section as the entirety must "conform to the contours of the seabed" (4/20-21). As to claim 35, *Harrison* does not teach laying a distributed buoyancy section of pipeline. *Harrison* teaches deflecting a single section of pipeline disposed over a topographic feature upward with a single buoy to impart slack so that the pipeline will lie flat against the seabed when the buoy is released during installation. In view of the above, it is respectfully submitted that *Harrison* fails to show or suggest the present invention as recited in claim 1 and the claims depending therefrom. Accordingly, withdrawal of the rejection in view of *Harrison* is respectfully requested.

Moses et al. discloses a riser system with a buoyancy device for limiting the bending stresses in the riser. *Moses et al.* discloses at 3/67 to 4/2 that "the riser has an upper end coupled to an offshore platform. Such platforms are typically drilling or production platforms." At least one end of the riser by definition does not extend to the sea floor, failing to meet the affirmatively recited requirement of claim 1 that both sections of pipeline

extend from the sea floor. Further, there are no references in *Moses et al.* to traversing topographic features. In fact, the figures only disclose a flat seabed. *Moses et al.* teaches a riser with "coupling lines between the subsea well head or template and the work or production platform on the *surface* of the sea" (1/15-17, emphasis added). *Moses et al.* discloses moving fluid and tools to and from the sea floor and the surface rather than across a topographic feature as recited in claim 1.

As to claim 4, *Moses et al.* does not disclose a buoyant coating material, only buoyancy elements that are attached to the riser. See Figures 2-6. As to claim 7, *Moses et al.* only teaches a negatively buoyant riser and not a first and second pipeline section that are positively buoyant. At 1/63-65 *Moses et al.* states, "as the riser approaches the seabed, it assumes a continuous bend due to its natural tendency to droop under its own weight." Drooping as disclosed does not occur in a positively buoyant pipeline section. As shown in Figures 1 and 4, the riser is not a positively buoyant pipeline section because it contacts the seabed without the use of an anchor, which is contrary to positive buoyancy. *Moses et al.* does not disclose a positively buoyant first and second pipeline sections, only a negatively buoyant riser with a buoy added to impart positive buoyancy to a distal end.

Nor would Applicant's invention have been obvious in light of *Moses et al.* *Moses et al.* teaches adding buoyancy elements to a riser to mitigate the bending stresses caused by the movement of the riser due to having a connection at the undulating sea surface. There is no topographic feature disclosed. *Moses et al.* does not recognize the problem of traversing a topographic feature. It only discloses a substantially flat ocean floor. Without the impermissible hindsight benefit of applicant's own disclosure, it would not have been obvious to one skilled in the art that *Moses et al.* would successfully function when disposed in or above a topographic feature which is not substantially flat.

Moses et al. fails to bridge the gap from *Harrison* to applicant's invention of claims 9-48. Neither reference discloses traversing a topographic feature with a buoyant pipeline region between sections of the pipeline on either side of the buoyant region that lie on the sea floor.

Paulsen et al. discloses a floating pipeline system but does not anticipate or make obvious Applicant's claims 1-48. Applicant's claim 1 includes a "pipeline comprising a first unbuoyed pipeline section extending from said first location on a sea floor to said distributed buoyancy region and a second unbuoyed pipeline section extending from said distributed buoyancy region to said second location on a sea floor."

Paulsen et al. does not teach or suggest an unbuoyed pipeline section that connects from the sea floor to a distributed buoyancy region and back to an unbuoyed pipeline section that extends from the sea floor as claimed. In sharp contrast, Figures 2 and 4-5 of *Paulsen et al.* disclose a straight pipeline that never extends to or from the sea floor and is buoyed on the entire length of the pipeline. Furthermore, *Paulsen et al.* states at page 108 in the "Introduction" section that "the basic idea is to keep a pipeline positively buoyant at *all* times and to anchor the pipeline to the sea floor at regular intervals". See page 108 and Figures 2, 4 and 5 (emphasis added). This is in sharp contrast to claim 1. *Paulsen et al.* teaches traversing the entire seabed, not traversing the topographic feature from an adjacent sea floor pipeline as in Applicant's claims.

As to claim 9, *Paulsen et al.* does not disclose a flexure control device located proximate to a cliff edge. As to claims 10-12, *Paulsen et al.* does not disclose a flex joint, stress joint, or swivel. As to method claim 35, as stated above *Paulsen et al.* does not disclose laying a negatively buoyant pipeline section that extends from the sea floor at a first location. Nor would it have been obvious to extend a pipeline from the sea floor since *Paulsen et al.* only teaches laying a fully floating (positively buoyant) pipeline. As to method claims 37 and 45, *Paulsen et al.* does not disclose a mating or

connection device. As to method claim 45, *Paulsen et al.* does not disclose connecting a first pipeline to a second pipeline across an undersea topographic feature.

New claims 49 and 50 recite a distributed buoyancy region that is shaped as a catenary and inverse catenary, respectively. Nowhere in *Paulsen et al.* is a catenary or inverse catenary shaped distributed buoyancy region taught or suggested.

New claim 51 emphasizes that Applicant's invention does not require the use of a clump weight to function, in sharp contrast to *Paulsen et al.* which states at page 108 that the floating pipeline is "anchor[ed] … to the seafloor at regular intervals."

Claims 1-48 stand rejected as obvious in view of *Paulsen et al.* and *Soliman et al.* In addition to the arguments above that *Paulsen et al.* does not anticipate or suggest Applicant's invention, *Soliman et al.* fails to bridge the gap from *Paulsen et al.* to applicant's invention. *Soliman et al.* discloses that complex topography is a challenge to laying pipeline, but does not teach or suggest any solution to the problem. The purported combination of these references thus would not have made obvious the applicant's invention. Dependent claims are allowable for at least the same reasons.

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. If any issues remain that are appropriate for resolution by telephone interview, please contact undersigned counsel.

Respectfully submitted,

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